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TRACKING TRENDS & PERFORMANCE IN BASIC RESEARCH

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2009 : March 2009 - New Hot Papers : Martine P. Bos

NEW HOT PAPERS - 2009

March 2009



Martine P. Bos talks with ScienceWatch.com and answers a few questions about this month's New Hot Paper in the field of Microbiology. The author has also sent along images of her work.



Article Title: Biogenesis of the gram-negative bacterial outer membrane

Authors: Bos, MP;Robert, V;Tomassen, J

Journal: ANNU REV MICROBIOL

Volume: 61

Page: 191-214

Year: 2007

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SW: Why do you think your paper is highly cited?

I think our paper is highly cited because it provides a comprehensive overview of all aspects of outer membrane (OM) biogenesis in gram-negative bacteria. Most previous reviews dealt with only outer membrane proteins (OMPs), or lipids, or lipoproteins. Also, there has been a lot of progress in this field in recent years, with the elucidation of key components of the OMP assembly machinery and of the lipopolysaccharide transport system, and we included many recent new discoveries in this review.

SW: Would you summarize the significance of your paper in layman's terms?

Many infectious diseases are caused by a special type of bacteria, called gram-negative bacteria. They contain a specialized surface, the outer membrane. Bacterial diseases can often be cured with antibiotics, but as most people know, the emergence of antibiotic-resistant bacteria is an increasing problem, and thus, novel antibiotics need to be developed.

One way to design effective antibiotics is to understand how the surface of the bacterium is formed, and then to use this knowledge to rationally design antibiotics that will enter the bacteria and inhibit essential processes necessary for their survival. Also, an understanding of what makes up the surface of the bacterium is necessary to design effective vaccines.

SW: How did you become involved in this research, and were there any problems along the way?

I became involved in research on bacterial infectious diseases when John Swanson, then head of the laboratory of Microbial Structure and Function at the Rocky Mountain Laboratories of the National Institute of Allergy and

Infectious Diseases, NIH, Hamilton, MT, offered me the opportunity to do a post-doc in his lab. I worked there on the interaction of the gonorrhea-causing bacterium *Neisseria gonorrhoeae* with human host cells.

Since my return to Holland, I have been focusing on outer membrane biogenesis in a closely related bacterium, *Neisseria meningitidis*. Also, we try to apply our findings to the development of vaccines.

I would not say there were many problems along the way, besides the usual frustrations that any scientist encounters. Luckily, there were enough exciting findings to make up for the frustrations.

SW: Where do you see your research leading in the future? Do you foresee any social or political implications for your research?

I hope my research will contribute significantly to an overall fundamental understanding of how bacterial surfaces are formed. There are still many unanswered questions. I expect, especially from comparing these fundamental processes in different organisms, both experimentally and by *in silico* genome mining, to gain more insights.

I also hope that our research will continue to contribute to the design of novel antibiotics and vaccines. We have already developed a fruitful collaboration with the pharmaceutical company GlaxoSmithKline to develop vaccines against *Neisseria meningitidis*, a bacterium causing sometimes fatal meningitis and sepsis, especially in very young children. In developed countries, this bacterium carries one of the only very few infectious diseases which can cause infants to die.

Even more dreadful is the fact that this bacterium causes waves of epidemic disease in Africa, in the so-called meningitis belt, causing thousands of deaths every year. I sincerely hope our research will contribute to the development of effective vaccines that will prevent this devastating disease from making further inroads.

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KEYWORDS: LIPOPOLYSACCHARIDE; OUTER MEMBRANE PROTEINS; LIPOPROTEINS; PHOSPHOLIPIDS.

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Figure 1: [+details](#)

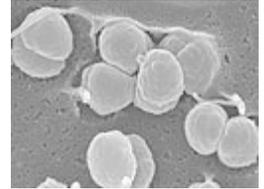


Figure 2:

